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Keith, Jr.

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(54) **ENVIRONMENT MANAGER**

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This patent is subject to a terminal disclaimer.

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(51) **Int. Cl.**

G06F 15/173	(2006.01)
G06F 9/54	(2006.01)
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G06F 11/34	(2006.01)

(52) **U.S. Cl.**

CPC ***G06F 9/54*** (2013.01); *G06F 11/3058* (2013.01); *G06F 11/3409* (2013.01)

(58) **Field of Classification Search**

CPC G06F 9/54
USPC 709/223
See application file for complete search history.

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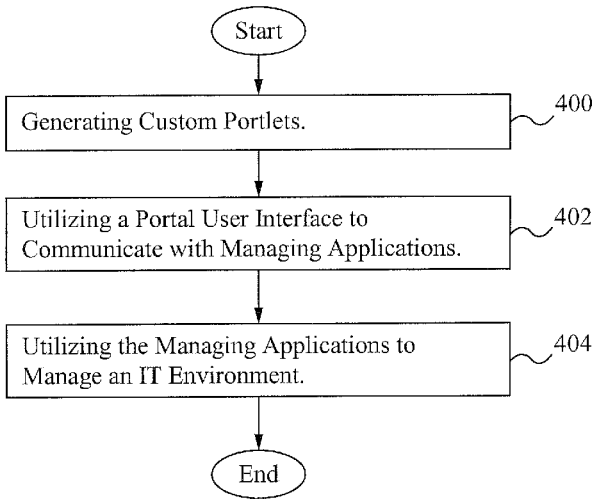
(57) **ABSTRACT**

An environment manager includes a set of consolidated and integrated utilities which allow an administrator direct, remote access to information technology resources. The environment manager allows the administrator to control many aspects of the information technology environment including backup and archival of data systems, monitoring of systems, opening and closing of information technology systems, server fail-overs and virtual server environments, managing expert application, desktop management and security and system security.

28 Claims, 4 Drawing Sheets



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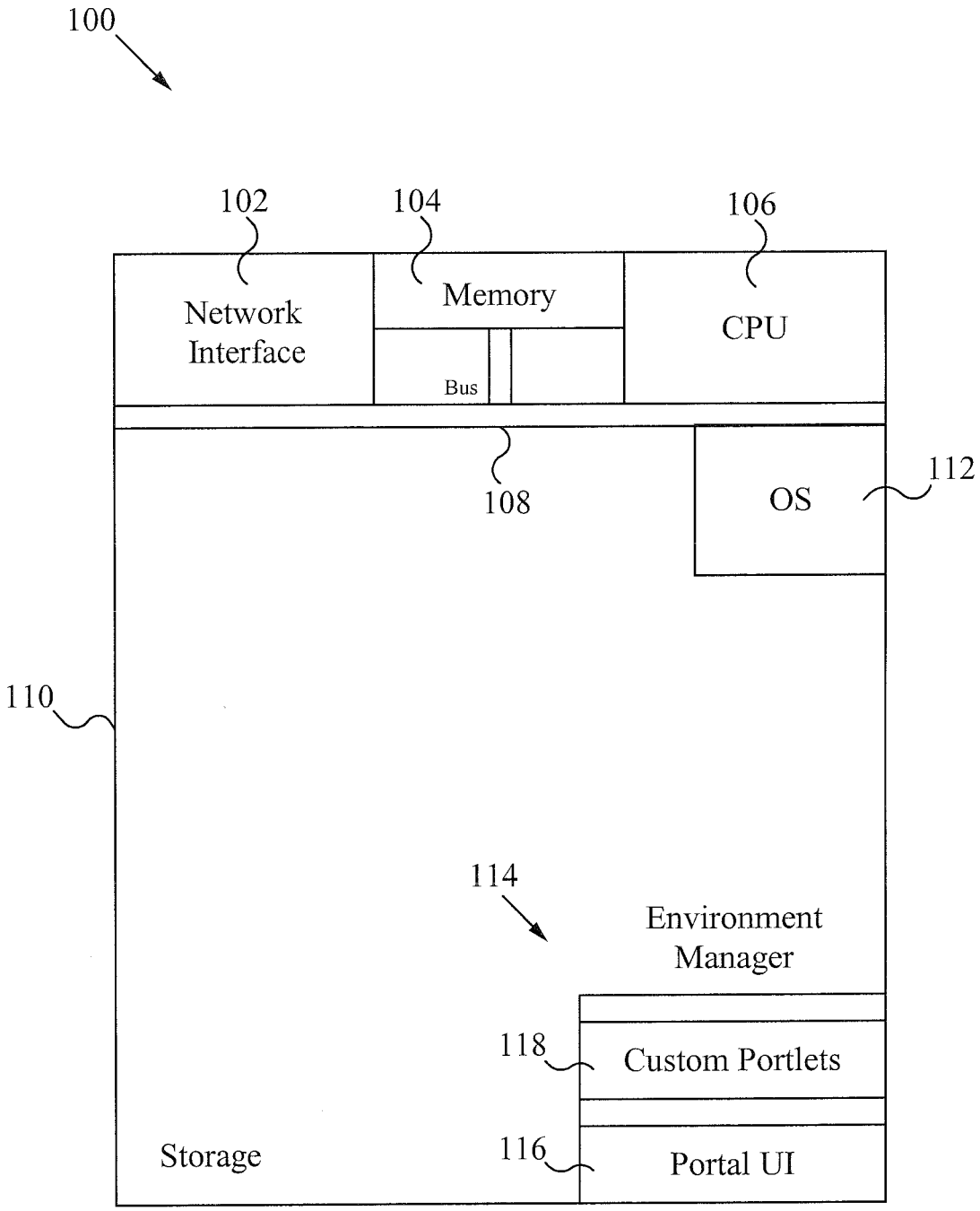
100
102
104
106
Network Interface
Memory
Bus
CPU
108
OS
112
110
114
Environment Manager
118
Custom Portlets
116
Portal UI
Storage

Fig. 1

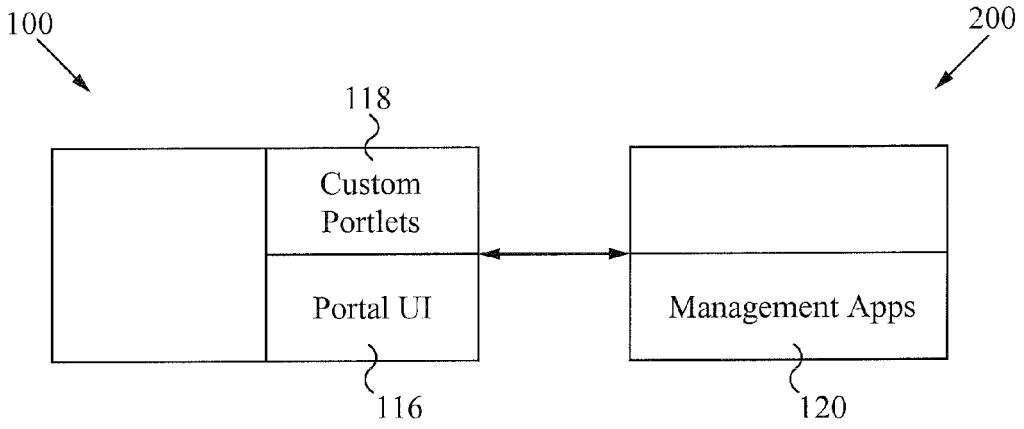
100
200
118
Custom Portlets
Portal UI
Management Apps
116
120

Fig. 2A

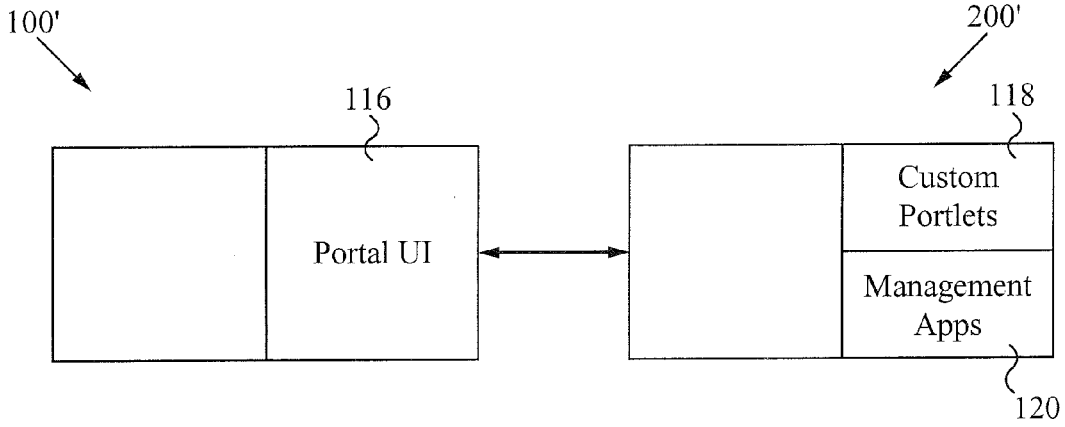
100'
200'
116
118
Portal UI
Custom Portlets
Management Apps
120

Fig. 2B

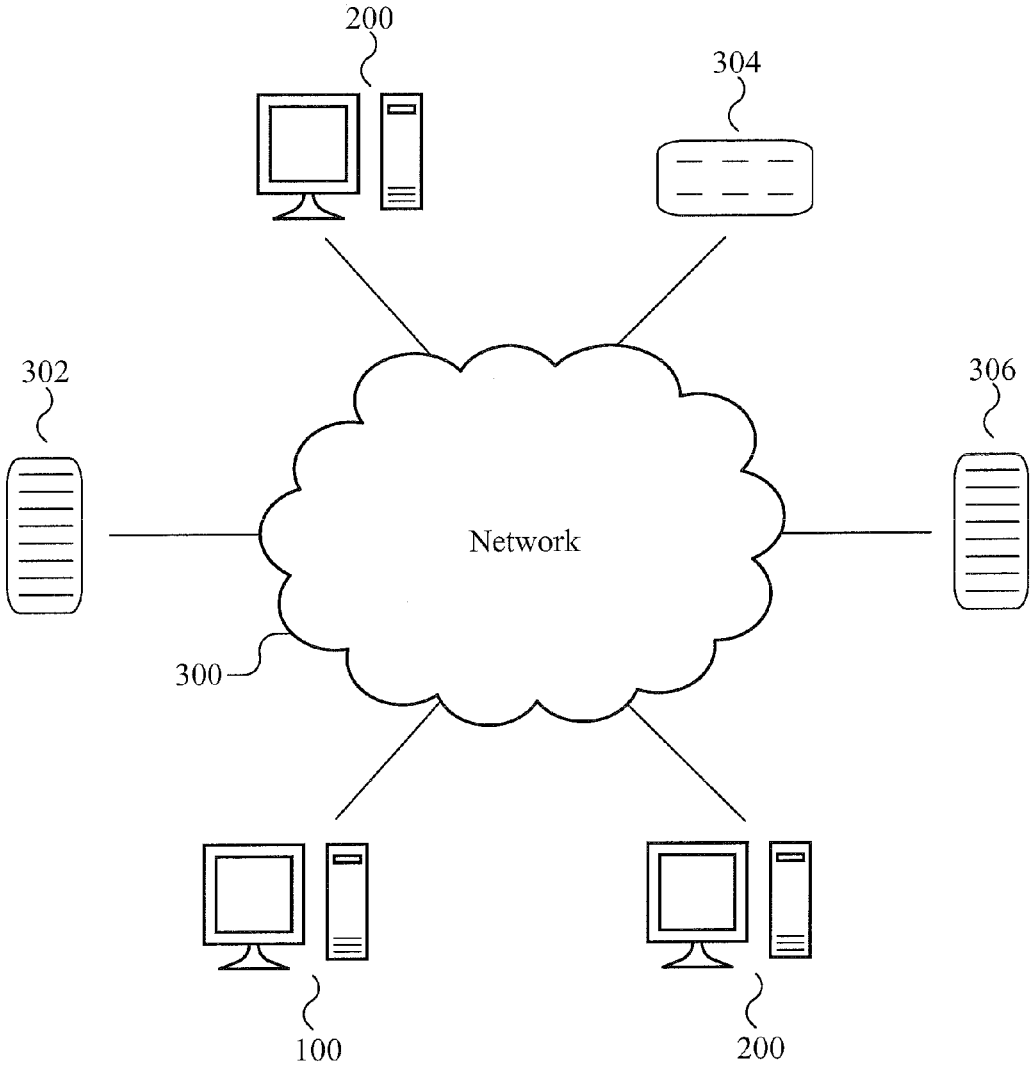

Fig. 3

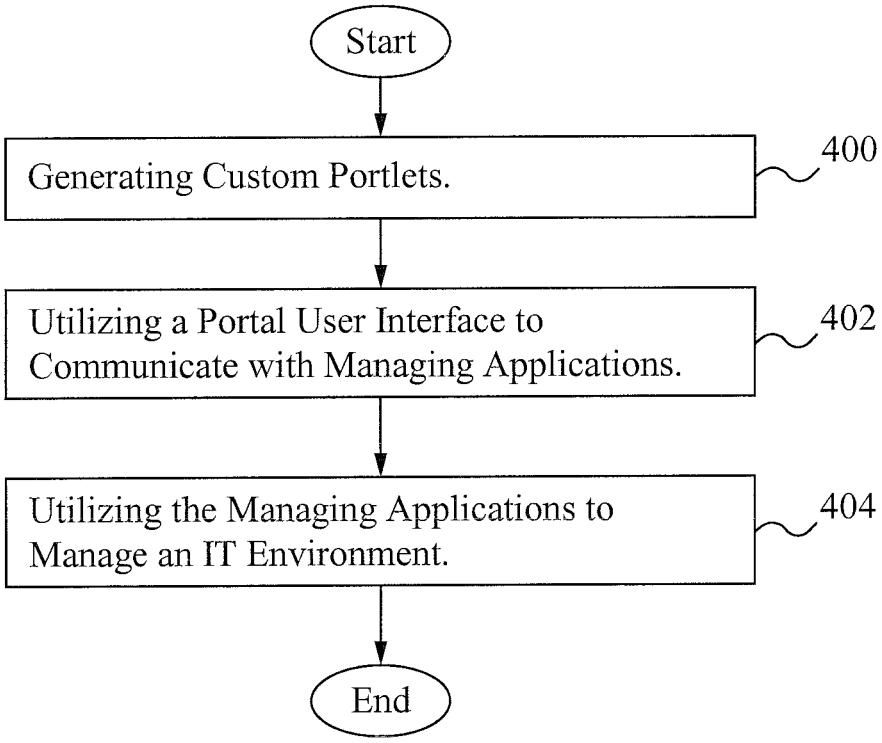
Start
Generating Custom Portlets.
400
Utilizing a Portal User Interface to Communicate with Managing Applications.
402
Utilizing the Managing Applications to Manage an IT Environment.
404
End

Fig. 4

ENVIRONMENT MANAGER

RELATED APPLICATION(S)

The present application is a continuation of co-pending U.S. patent application Ser. No. 11/977,890, filed Oct. 26, 2007, and entitled "ENVIRONMENT MANAGER," which is hereby incorporated by reference.

FIELD OF THE INVENTION

The present invention relates to the field of computing. More specifically, the present invention relates to the field of managing information technology environments.

BACKGROUND OF THE INVENTION

Information Technology (IT) management is a combination of IT and management which is the management of computer-based information systems. The reason why IT needs to be managed stems from the continuous growth in IT systems. Initially, when networking began, typically individual computers were coupled to a computer which was serving data. This computer serving data was usually set up and controlled by a single person. Therefore, considering the entire system included one person and one computer, little management was needed.

However, with the incredible growth of the Internet, companies, in addition to academia, the government and individuals, began utilizing the Internet for more complex tasks. Again, at first, it was possible for a company to set up a static website which required little computing power and resources. With the advent of e-commerce and other advances in the Internet, companies moved on to interactive websites which allow users to send, store and manipulate data on a company's website. Additionally, the uptime requirements for websites increased considering downtime equaled lost revenue. For instance, a major website being down for a few minutes could result in millions of dollars in lost revenues, not to mention user dissatisfaction. Moreover, in some instances, data needs to be very secure, such as customers' credit card information or employment information.

Therefore, to confront all of these new requirements of content, stability and security, the complexity of IT management has grown significantly. Unlike the early days of networking when computing systems were small, possibly even one computer, present IT systems comprise many hardware and software components which are very interconnected. A typical IT system today is likely to include many servers, many backup devices, one or more firewalls for security, other networking components such as routers and hubs and a huge amount of software applications which are used in many tasks ranging from accessing, storing, manipulating and securing data. To manage the complex IT systems of today and in the future, IT management has to continuously evolve and adapt, so that these systems remain manageable.

SUMMARY OF THE INVENTION

An environment manager includes a set of consolidated and integrated utilities which allow an administrator direct, remote access to information technology resources. The environment manager allows the administrator to control many aspects of the information technology environment including backup and archival of data systems, monitoring of systems, opening and closing of information technology systems, server fail-overs and virtual server environments, managing expert application, desktop management and security and system security.

In one aspect, a system for managing an information technology setup comprises a set of management applications for managing a first computing device, a set of custom portlets coupled to the set of management applications for transferring data to and from the management applications and a portal user interface coupled to the set of custom portlets for communicating with the set of management applications through the custom portlets. The set of management applications are stored on the first computing device. The set of custom portlets are stored on the first computing device. Alternatively, the set of custom portlets are stored on a second computing device. The portal user interface is stored on a second computing device. The second computing device is remote from the first computing device. The portlets enable cross-platform communication. The first computing device is selected from the group consisting of a personal computer, a server, a laptop, a cellular phone, a gaming system, a PDA and a networking device. Managing the first computing device includes at least one of backing up and archiving data, monitoring environmental conditions, handling server fail-over and virtual server environments, desktop management, desktop security, applications management and security.

In another aspect, a system for managing an information technology setup comprises a computing device containing a portal user interface and a set of additional computing devices coupled to the computing device, wherein each of the additional computing devices contain a set of management applications for managing each of the additional computing devices. The computing device further contains a set of portlets. Alternatively, each of the additional computing devices contain a set of portlets. The computing device is remote from the set of additional computing devices. The portlets enable cross-platform communication. The additional computing devices are selected from the group consisting of a personal computer, a server, a laptop, a cellular phone, a gaming system, a PDA and a networking device. Managing each of the additional computing devices includes at least one of backing up and archiving data, monitoring environmental conditions, handling server fail-over and virtual server environments, desktop management, desktop security, applications management and security.

In another aspect, an apparatus for managing an information technology setup comprises a processing component and a portal interface for utilizing the processing component to communicate with a set of additional computing devices. The apparatus further comprises a set of portlets for providing a mechanism for the portal interface to communicate with the additional computing devices. The portal user interface utilizes the set of portlets to communicate with a set of management applications stored on each of the additional computing devices. The set of portlets are contained on the computing device. Alternatively, the set of portlets are contained on each of the additional computing devices. The computing device is remote from the set of additional computing devices. The portlets enable cross-platform communication. The additional computing devices are selected from the group consisting of a personal computer, a server, a laptop, a cellular phone, a gaming system, a PDA and a networking device. Communicating with the set of additional computing devices includes at least one of backing up and archiving data, monitoring environmental conditions, handling server fail-over and virtual server envi-

ronments, desktop management, desktop security, applications management and security.

In yet another aspect, a method of for managing an information technology setup comprises generating a set of custom portlets, utilizing a portal user interface to communicate with a set of management applications through the custom portlets and utilizing the management applications to manage a set of additional computing devices. The portal user interface is contained on a computing device. The computing device is remote from the set of additional computing devices. The portlets enable cross-platform communication. The additional computing devices are selected from the group consisting of a personal computer, a server, a laptop, a cellular phone, a gaming system, a PDA and a networking device. Utilizing the management applications to manage the set of additional computing devices includes at least one of backing up and archiving data, monitoring environmental conditions, handling server fail-over and virtual server environments, desktop management, desktop security, applications management and security. Utilizing the management applications to manage the set of additional computing devices includes automatically executing a process when a condition is met.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a block diagram of an environment manager computing device implementing an environment manager.

FIG. **2**A illustrates a block diagram of an embodiment of an environment manager computing device coupled to a device containing management applications.

FIG. **2**B illustrates a block diagram of an embodiment of an environment manager computing device coupled to a device containing management applications and custom portlets.

FIG. **3** illustrates a graphical representation of a network with an environment manager computing device.

FIG. **4** illustrates a flowchart of a process of utilizing an environment manager to manage multiple IT environments.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

An environment manager is a consolidated interface and an integrated platform which allows an Information Technology (IT) administrator direct remote access to IT resources. The environment manager allows the IT administrator to control many aspects of the IT environment including, but not limited to, back up and archival of data systems, monitoring of all systems such as environment conditions, opening/closing and monitoring of IT systems, server fail-overs and virtual server environments, a managing expert application, desktop management, desktop security, and back up and applications management, and system security. The managing expert application allows an IT administrator or consulting company to manage and consolidate multiple sites from a single console.

The environment manager uses portal technology, where a user is able to define the look and feel of his/her own interface. Portal technology allows a single point of access to information which is linked from various logically related applications. Furthermore, although the information is presented in a unified manner, the information is able to be from diverse sources. Each system application that is able to be controlled by the portal exposes an interface to the portal. The interface is then defined as a portlet, wherein portlets are pluggable user interface components that are managed and displayed in a portal. Using this implementation, a single individual is able to monitor an IT environment through the portal very easily.

FIG. **1** illustrates a block diagram of an environment manager computing device **100** implementing an environment manager **114**. The environment manager computing device **100** contains standard computing components including a network interface **102**, a memory **104**, a central processing unit **106**, a system bus **108** and storage **110** in addition to other standard computing components. Furthermore, the environment manager computing device **100** is able to have multiple of each of these components, for example many computing devices such as servers have more than one central processing unit **106**. The storage **110** is able to be any storage implementation such as a hard disk drive, RAID, or another form of storage. Contained within the storage area are several components of the environment manager **114**. The environment manager **114** comprises a portal user interface **116**, custom portlets **118** and management applications **120** (FIG. **2**). The portal user interface **116** enables easy user interaction with the environment manager **114**. The custom portlets **118** are configured and defined to provide the desired look and feel for applications such as the management applications **120** which are stored on another computing device. Furthermore, the portlets **118** enable utilization of the management applications **120** on a variety of machines. The management applications **120** are able to manage many different aspects of an IT environment. The management applications **120** are also able to monitor environmental aspects such as capacity, temperature and system loads in a network in addition to other aspects of the network. In some embodiments, the custom portlets are stored on another computing device instead of the environment manager computing device **100**. Specifically, in some embodiments, the custom portlets are stored on the same device(s) that contain(s) the management application(s).

FIG. **2**A illustrates a block diagram of an embodiment of an environment manager computing device **100** coupled to a device **200** containing management applications **120**. In an embodiment, the portal user interface **116** and the custom portlets **118** are stored on the environment manager computing device **100**. The environment computing device **100** communicates with the device **200** via the custom portlets **118**. Specifically, the portal user interface **116** is able to send and receive data to/from the management applications **120** through the custom portlets **118**.

FIG. **2**B illustrates a block diagram of an embodiment of an environment manager computing device **100'** coupled to a device **200'** containing management applications **120** and custom portlets **118**. In this embodiment, the environment manager computing device **100'** contains the portal user interface **116**, and the device **200'** contains the custom portlets **118** and the management applications **120**. Although the configuration is slightly different from that shown in FIG. **2**A, the portal user interface **116** is still able to send and receive data to/from the management applications **120** through the custom portlets **118**.

FIG. **3** illustrates a graphical representation of a network with an environment manager computing device **100**. The environment manager computing device **100** is coupled to a network **300** to which many devices are coupled. The network **300** is coupled to servers **302** and **306**, personal computers **200** and a device such as a firewall **304**. Other computing devices such as laptops, cellular phones, gaming systems, PDAs and networking equipment are also able to couple to the network **300**. Furthermore, other networks are

able to couple to the network **300**. Moreover, within each device that is coupled to the network **300**, there are many different types of software applications that are able to run. These applications are able to be executed, configured, upgraded and manipulated in other ways. Utilizing the environment manager computing device **100**, an administrator is able to directly access the networked devices remotely. By accessing the networked devices remotely, the administrator is able to backup and archive data systems, monitor the networked devices, handle/configure server fail-overs and virtual server environments, implement a managing expert application, provide desktop management, desktop security and application management, provide system security and perform many other tasks.

FIG. **4** illustrates a flowchart of a process of utilizing an environment manager to manage multiple IT environments. In the step **400**, custom portlets are generated for each application in the network that is to be controlled using the portal interface within the environment manager. The custom portlets allow the portal to communicate with the applications on each device in the network. When additional components are added to the network, custom portlets are able to be generated and added for those additional components. For example, if a new backup device is installed, a custom portlet is able to be generated, so that the backup device is also able to be managed using the environment manager. In some embodiments, the custom portlets are previously generated, thus the step **400** is able to be skipped. In the step **402**, a portal user interface is used to communicate with management applications via the custom portlets. In the step **404**, the management applications send and retrieve data to and from the devices within the network to manage the IT environment. In some embodiments, the management applications are pre-existing on a device to be managed, while in other embodiments, the management applications are developed for the device. In some embodiments, the management applications are able to automatically execute a process when a condition is met.

For example, in an exemplary configuration a network includes two servers, a backup device, a firewall, fifty workstations and a variety of software applications on each device. Applications are developed which will communicate and manage the many components within the network. For example, an application is developed for the backup device that monitors the backup device's capabilities such as capacity, and that the backup device is functioning properly. Furthermore, applications are developed so that specific backup modifications are able to take place, such as how the data is saved on the backup device. Any feature that is able to be controlled locally is able to be performed via the environment manager. Additional applications and portlets are developed on the other devices, such as the servers, the firewall and the fifty workstations, so that they are all able to be monitored and managed from a remote location.

In addition to being able to manage devices and applications from a remote location, other qualities of a network are able to be monitored such as events and performance. For example, management applications are able to be configured to monitor a system for an event such as a drive failure. It is possible that a drive could fail in a remote location, but if it is being monitored using the environment manager, an administrator is able to take immediate action. Furthermore, the management applications are able to be configured to monitor a system's performance such as a CPU utilization approaching 100% could indicate a server attack or other issue, and an administrator monitoring this is able to take action to prevent the attack.

The environment manager with the portal is able to couple to many different aspects of a network to provide full environmental coverage. For example, the event manager with the portal is able to couple to 3rd party products, WAN services, desktop management, standby server consoles, storage consoles, backup consoles, security consoles, expert manager consoles and event/performance managers. By monitoring and communicating with each of these components, the portal enables a single user such as an administrator to easily and efficiently monitor an IT environment.

To utilize the environment manager, management applications are developed as well as portlets which allow communication between the management applications and a portal. The management applications are installed on computing devices that are to be monitored and managed. The portal is then used to monitor and manage events, performance and other environmental conditions on the computing devices. As situations arise, such as the need to modify a computing device's configuration, transfer data from one location to another or any other task, an administrator is able to perform such tasks remotely using the environment manager. Furthermore, multiple sites or networks are able to be managed through the environment manager. The portal is used to manage an environment either by text commands or preferably via a Graphical User Interface (GUI).

In operation, the environment manager continuously monitors a networked environment. When an event arises, an administrator is alerted, so that a desired action is able to be taken. In some embodiments, automatic action is taken based on conditions or scripts that are pre-determined and pre-developed. For example, a script is able to be written so that once a monitored hard drive reaches 90% capacity, the script will automatically start transferring some of the data to another storage location that is not almost full. In addition to monitoring events, the administrator is able to utilize the environment manager to modify the environment as desired. For example, if a new server is added to a network, the administrator is able to configure the network, so that the old server and new server share the serving duties appropriately. Aside from someone having to physically install the new server in an appropriate location, the management of the new server and the old server is able to occur from afar via the environment manager. Thus, if the new server and the old server are located in different locations, such as one in New Jersey and the other in California, instead of having to fly across the country for management, the environment manager is able to perform any configuration required from one location. Furthermore, the environment manager is able to accommodate cross-platform configurations such as if the first server is a Sun Microsystems® server running Solaris® while the second server is running Microsoft® Windows®. The environment manager is able to manage a variety of platforms because the environment manager utilizes specific applications to monitor and manage each computing device, and then utilizes portlets to communicate the data received from the specific applications to a portal in a system-agnostic manner which then presents the data to an administrator.

The present invention has been described in terms of specific embodiments incorporating details to facilitate the understanding of principles of construction and operation of the invention. Such reference herein to specific embodiments and details thereof is not intended to limit the scope of the claims appended hereto. It will be readily apparent to one skilled in the art that other various modifications may be

made in the embodiment chosen for illustration without departing from the spirit and scope of the invention as defined by the claims.

What is claimed is:

1. A computing device, comprising:

one or more processors; and

one or more hardware storage devices having stored thereon computer-executable instructions that are executable by the one or more processors to cause to the computing device to perform at least the following:

receive, from a remote system, one or more modification commands through a set of custom portlets associated with a set of management applications that are stored locally at the computing device and that are configured for managing the computing device, wherein the set of custom portlets are configured to enable transfer of the one or more modification commands to the set of management applications and to enable the set of management applications to control the computing device based on the one or more modification commands; and

locally automatically reconfigure the computing device when one or more predetermined conditions of the computing device are met, such that the set of management applications are able to continue to manage the computing device in accordance with the received one or more modification instructions when the computing device is unable to connect to the remote system.

2. The computing device as claimed in claim **1** wherein the set of custom portlets are stored on the computing device.

3. The computing device as claimed in claim **1** wherein the set of custom portlets are stored on another computing device.

4. The computing device as claimed in claim **1** wherein the portlets are associated with a portal user interface stored on another computing device.

5. The computing device as claimed in claim **4** wherein the other computing device is remote from the computing device.

6. The computing device as claimed in claim **1** wherein the custom portlets enable cross-platform communication.

7. The computing device as claimed in claim **1** wherein the computing device is selected from the group consisting of a personal computer, a server, a laptop, a cellular phone, a gaming system, a PDA and a networking device.

8. The computing device as claimed in claim **1** wherein reconfiguring the computing device includes at least one of backing up and archiving data, monitoring environmental conditions, handling server fail-over and virtual server environments, desktop management, desktop security, applications management and security.

9. A computer system configured for monitoring and controlling a computer environment, the computer system comprising:

a first computer device, comprising:

one or more processors; and

one or more hardware storage devices having stored thereon computer-executable instructions which are executable by the one or more processors to operate a portal user interface, the portal user interface being operable to communicate modification commands to one or more separate computing devices; and

a set of additional computing devices communicatively associated with the first computing device, wherein each of the additional computing devices comprises:

one or more processors; and

one or more hardware storage devices having stored thereon computer-executable instructions which are executable by the one or more processors to operate one or more management applications for managing and controlling the additional computing device, wherein the one or more management applications are configured to locally automatically reconfigure the additional computing device when one or more predetermined conditions of the additional computing device are met, such that the one or more management applications are able to reconfigure the additional computing device in accordance with any modification commands received from the first computer device through one or more portlets configured for transmitting the commands, the one or more management applications being enabled to execute the received modification commands when the additional computing device is unable to communicate with the first computing device.

10. The system as claimed in claim **9** wherein the first computing device further comprises a set of portlets.

11. The system as claimed in claim **10** wherein each of the additional computing devices comprise a set of portlets.

12. The system as claimed in claim **11** wherein the first computing device is remote from the set of additional computing devices.

13. The system as claimed in claim **10** wherein the portlets enable cross-platform communication.

14. The system as claimed in claim **10** wherein the additional computing devices are selected from the group consisting of a personal computer, a server, a laptop, a cellular phone, a gaming system, a PDA and a networking device.

15. The system as claimed in claim **10** wherein reconfiguring the additional computing device includes at least one of backing up and archiving data, monitoring environmental conditions, handling server fail-over and virtual server environments, desktop management, desktop security, applications management and security.

16. A computing device configured for monitoring and controlling a computer environment, the computing device comprising:

one or more processors; and

one or more hardware storage devices having stored thereon computer-executable instructions which are executable by the one or more processors to operate a portal interface configured to communicate with a set of additional computing devices using a set of portlets, the portal interface being configured to enable the computing device to utilize the set of portlets to send modification commands to one or more additional computing devices to control one or more management applications stored on the one or more additional computing devices, wherein the one or more management applications locally automatically reconfigure the one or more additional computing devices when one or more predetermined conditions of the one or more additional computing devices are met such that the one or more management applications are able to continue to control the one or more additional computing devices when the one or more additional computing devices are unable to connect to the computing device.

17. The apparatus as claimed in claim **16** wherein the set of portlets are contained on the computing device.

18. The apparatus as claimed in claim 16 wherein the set of portlets are contained on each of the additional computing devices.

19. The apparatus as claimed in claim 16 wherein the computing device is remote from the set of additional computing devices.

20. The apparatus as claimed in claim 16 wherein the portlets enable cross-platform communication.

21. The apparatus as claimed in claim 16 wherein the additional computing devices are selected from the group consisting of a personal computer, a server, a laptop, a cellular phone, a gaming system, a PDA and a networking device.

22. The apparatus as claimed in claim 16 wherein reconfiguring the one or more additional computing devices includes at least one of backing up and archiving data, monitoring environmental conditions, handling server fail-over and virtual server environments, desktop management, desktop security, applications management and security.

23. A computer-implemented method for monitoring and controlling a computer environment, the method being implemented by a computing system that includes at least one processor, the method comprising:

generating a set of custom portlets, the set of custom portlets being configured to enable transfer of modification instructions to respective management applications of one or more remote computing devices; and

sending one or more modification commands over a network using the custom portlets, the one or more modification commands instructing one or more management applications to reconfigure one or more remote computing devices, wherein the modification instructions cause the one or more management applications to locally automatically reconfigure the one or more remote computing devices when one or more predetermined conditions of the one or more remote computing devices are met such that the management applications are able to reconfigure the one or more remote computing devices when the one or more remote computing devices are unable to connect to the network.

24. The method as claimed in claim 23 wherein the custom portlets enable cross-platform communication.

25. The method as claimed in claim 23 wherein the one or more remote computing devices are selected from the group consisting of a personal computer, a server, a laptop, a cellular phone, a gaming system, a PDA and a networking device.

26. The method as claimed in claim 23 wherein reconfiguring the one or more remote computing devices includes at least one of backing up and archiving data, monitoring environmental conditions, handling server fail-over and virtual server environments, desktop management, desktop security, applications management and security.

27. A computer system configured as an environment manager for managing and reconfiguring a computer network, the computer system comprising:

a first computer device, comprising:

one or more processors; and

one or more hardware storage devices having stored thereon computer-executable instructions which are executable by the one or more processors to operate a set of management applications for managing the first computing device, wherein the set of management applications are stored on the first computing device; and

a second computing device, comprising:

one or more processors; and

one or more hardware storage devices having stored thereon computer-executable instructions which are executable by the one or more processors to operate a portal user interface, the portal user interface being configured to enable the second computing device to communicate with the first computing device over a network using a set of custom portlets respectively associated with the set of management applications, the portlets configured to enable transfer of modification commands to the management applications to enable the management applications to control the first computing device based on the commands such that the management applications locally automatically reconfigure the first computing device when one or more predetermined conditions of the first computing device are met such that the management applications are able to continue to control the first computing device when the first computing device is unable to communicate with the second computing device,

wherein an additional custom portlet is generated by the environment manager for each application to be controlled on an additional computing device when the additional computing device is coupled to the network.

28. A computer system configured for controlling and reconfiguring an information technology setup comprising:

a plurality of memory devices each comprising a set of management applications for managing a plurality of first computing devices, wherein the set of management applications are stored on the first computing devices;

a plurality of sets of custom portlets each communicatively associated with one of the sets of management applications for controlling the management applications by transmitting one or more commands to the management applications wherein the management applications manage the plurality of first computing devices based on the one or more commands, wherein the management applications locally automatically manage the first computing devices when one or more predetermined conditions of the first computing devices are met such that the management applications are able to continue to control and reconfigure the first computing devices when the first computing devices are unable to connect to the remainder of the system; and

a portal user interface coupled to each of the sets of custom portlets for communicating with the sets of management applications through the custom portlets,

wherein each set of management applications correspond to an individual first computing device that the management applications control and further wherein an additional custom portlet is generated by the system when an additional computing device is coupled to a network.

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